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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/910,661	07/20/2001	Vishnu K. Agarwal	500431.04	3239

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EXAMINER

GOUDREAU, GEORGE A

ART UNIT PAPER NUMBER

1763

DATE MAILED: 11/14/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

### Office Action Summary

Application No.

09/010,661

Applicant(s)

AGARWAL, VISHNU K.

Examiner

George A. Goudreau

Art Unit

1763

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 21 October 2003 (i.e. -the RCE).
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 68-70, 72, 78, 79 and 81-93 is/are pending in the application.
- 4a) Of the above claim(s) 90-93 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 68-70, 72, 78, 79, 81-89 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.  
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

#### Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 68-72, 78-79, and 81-89 are rejected under 35 U.S.C. 103(a) as being unpatentable over Meikle et. al. (5,439,551).

Meikle et. al. disclose a process for monitoring the progress of a cmp polishing process which is used to planarize a layer of material on a semiconductor wafer. The cmp polishing process is then automatically terminated upon the detection of a change in the concentration of Ti ions in the cmp slurry. The cmp slurry effluent is withdrawn from the cmp polishing platen (36) using a sampling tube (52) which is coupled to a mass spectrometer (54) wherein the cmp slurry is analyzed for its Ti content using a mass spectrometer. This is discussed specifically in columns 4, 6; and discussed in general in columns 1-10. This is shown specifically in figure 5; and shown in general in figures 1-6. Meikle et. al. fail, however, to disclose the following aspects of applicant's claimed invention:

- the specific cmp polishing of the type of substrates which are claimed by the applicant in applicant's apparatus claims;
- the specific usage of a vaporizer which is coupled to the slurry sampling tube to vaporize the slurry sample prior to admitting it to the mass spectrometer;
- the specific usage of a filter to filter out abrasive particles from the slurry sample prior to admitting the sample to the vaporizer; and

-the specific usage of automatic control means which are coupled between the mass spectrometer endpoint detection device, and the cmp polishing platen to automatically terminate the cmp polishing process upon detection of the endpoint of the cmp polishing process

In regards to applicant's recitation in their apparatus claims that they cmp polish specific types of wafers, the examiner cites the case law listed below of interest to the applicant.

Furthermore, it is obvious to one skilled in the art that the configuration of the substrate worked upon by the apparatus claimed in this invention is not patentable in view of In re Young (25 U.S.P.Q. 69, 71 (CCPA 1935)) and In re Rishoi (94 U.S.P.Q. 71,73 (CCPA 1952)). The Court of Customs and Patent Appeals stated in In re Young that inclusion of material worked upon by a machine as element in claim may not lend patentability since claim is not otherwise allowable. Similarly, the Court of Customs and Patent Appeals stated in In re Rishoi that there is no patentable combination between a device and the material upon which it works.

Thus, it is irrelevant that the cmp polishing apparatus in the prior art used to reject applicant's apparatus claims do not specifically teach the cmp polishing of the types of wafers which are claimed by the applicant since this cmp apparatus is inherently capable of processing these types of wafers. Further, the wafer which is cmp polished is not part of the apparatus which is claimed by the applicant since the cmp apparatus claimed by the applicant may be used to cmp polish other types of substrates than those which are specifically claimed by the applicant.

It would have been obvious to one skilled in the art to employ a vaporizer to convert the liquid cmp slurry effluent sample which is withdrawn from the cmp polishing platen in the apparatus/ process taught by Meikle et. al. based upon the following. The usage of a vaporizer to convert a liquid sample to be analyzed in a mass spectrometer to a vapor prior to admitting the sample to the mass spectrometer is conventional or at least well known in the chemical

instrumental arts. (The examiner takes official notice in this regard.) Further, this would have simply provided a means for desirably facilitating the analysis of the liquid cmp slurry effluent sample by a mass spectrometer by converting the sample into a vapor form in which the mass spectrometer can more accurately, and more easily analyze the contents of the sample.

It would have been obvious to one skilled in the art to provide a means for filtering out the abrasive slurry particles from the liquid cmp slurry effluent sample which is withdrawn from the cmp polishing platen in the process taught above based upon the following. The usage of a filter to remove solid particles from a liquid sample to be analyzed by a mass spectrometer is conventional or at least well known in the chemical instrumentation arts. (The examiner takes official notice in this regard.) Further, the specific usage of a filter to remove abrasive particles from the liquid cmp effluent sample in the process taught above would desirably provide means for preventing the undesirable clogging of the tube which feed the sample to be analyzed through the mass spectrometer.

It would have been obvious to one skilled in the art to employ control means which are coupled between the mass spectrometer endpoint detection means, and the cmp polishing platen in the cmp polishing apparatus taught above to automatically terminate the cmp polishing process upon detection of the endpoint of the cmp polishing process based upon In re Venner as cited below.

In re Venner (120 U.S.P.Q. 192 (CCPA )) states that it is not an "invention" to broadly provide mechanical or automatic means to replace manual activity which has accomplished the same results.

3. Claims 68-72, 78-79, and 81-89 are rejected under 35 U.S.C. 103(a) as being unpatentable over the reference as applied in paragraph 2 above further in view of either (Robinson et. al. (5,868,896) or Sandhu et. al. (5,700,180)).

The references as applied in paragraph 2 above fail to disclose the following aspects of applicant's claimed invention:

-the specific usage of automatic control means which are coupled between the mass spectrometer endpoint detection device, and the cmp polishing platen to automatically terminate the cmp polishing process upon detection of the endpoint of the cmp polishing process

Robinson et. al. teach that it is desirable to monitor the thickness of a film to be cmp polished on a wafer insitu, and to automatically terminate the cmp polishing process upon detection of the endpoint using automatic control means. This is discussed specifically in columns 2-3, 8; and discussed in general in columns 1-12. This is shown in figures 1-9.

Sandhu et. al. teach that it is desirable to monitor the thickness of a film to be cmp polished on a wafer insitu, and to automatically terminate the cmp polishing process upon detection of the endpoint using automatic control means. This is discussed specifically in columns 7-10, 14-15; and discussed in general in columns 1-16. This is shown in figures 1-17.

It would have been obvious to one skilled in the art to employ control means which are coupled between the mass spectrometer endpoint detection means, and the cmp polishing platen in the cmp polishing apparatus taught above to automatically terminate the cmp polishing process upon detection of the endpoint of the cmp polishing process based upon the following. Both Sandhu et. al., and Robinson et. al. teach that it is desirable to do so.

4. Applicant's arguments filed 8-22-03' have been fully considered but they are not persuasive.

Applicant argues the following points regarding the examiner's rejection of their claimed subject matter.

-None of the references used by the examiner to reject applicant's claimed subject matter specifically disclose the usage of automatic control means which are coupled between the mass spectrometer endpoint detection device, and the cmp polishing platen to automatically terminate the cmp polishing process upon detection of the endpoint of the cmp polishing process. Further, there is no motivation in the prior art of record to modify the prior art to incorporate such control means to do such.

The examiner must disagree.

-The examiner has cited case law of interest to the applicant which render it obvious to use such automatic control means to automatically terminate the cmp polishing process in the cmp polishing apparatuses taught above upon detection of the cmp polishing endpoint.

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner George A. Goudreau whose telephone number currently is (703) -308-1915. My telephone number will be changing to (571)-272-1434 at some time during December 2003 due to my relocation to the new patent office facility. The examiner can normally be reached on Monday through Friday from 9:30 to 6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Examiner Gregory Mills, can be reached on (703) -308-1633. The appropriate fax phone number for the organization where this application or proceeding is assigned currently is (703) -306-3186. My fax number will be changing to (571)-273-1434 at some time during December 2003 due to my relocation to the new patent office facility.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) -308-0661.

  
George A. Goudreau/gag

Primary Examiner

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